IFW

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Inventors: Joachim LOHR, et al.

Appln. No.: 10/583,090

Filed: June 15, 2006

For: HARQ PROTOCOL WITH SYNCHRONOUS RETRANSMISSIONS

PETITION TO MAKE SPECIAL

Assistant Commissioner of Patents
Washington, DC 20231

Sir:

The Applicants respectfully petition that the above-captioned application be granted special status. The requirements of MPEP section 708.02(VIII) are complied with as follows:

(1) The petition fee set forth in 37 CFR 1.17(i) is authorized to be charged to Deposit Account No. 19-4375.

(2) All pending claims (claims 28-53) of the present application are believed to be directed to a single invention; if the Office determines that all the claims presented are not obviously directed to a single invention, the Applicants agree to make an election without traverse as a prerequisite to the grant of special status.

(3) A pre-examination search has been made in the form of a search report in a counterpart PCT International Application (International Search Report dated June 10, 2005 in PCT/EP2004/014441). Under MPEP 708.02, VIII, a search made by a foreign patent office satisfies the search requirement. An Information Disclosure Statement directed to the references cited in the ISR was filed on June 15, 2006.

Also, a pre-examination search has been made, and an Information Disclosure Statement directed thereto is attached. The field of search is:

Class 370, subclasses 278, 282, 328 and 329;

Class 709, subclass 237; and

Class 714, subclasses 748-750.

Examiners Wellington Chin and John Pezzlo were consulted for the above field of search.

(4) One copy each of the prior art deemed most closely related to the subject matter encompassed by the claims is of record in the form of the art cited in the Information Disclosure Statement filed June 15, 2006, and the Information Disclosure Statement filed herewith.

(5) The following is a detailed discussion of the art of record, and comments pointing out how the instant claimed subject matter is patentably distinguishable thereover.

A. Discussion of All References of Record

D. Chase: "Code combining: A maximum-likelihood decoding approach for combining an arbitrary number of noisy packets", IEEE Transactions on Communications, Col. COM-33, pages 385 to 393, May 1985 discussed in the paragraph at application page 2, lines 23-28, states that in Chase-combining, retransmission packets carry identical symbols, and multiple received packets are combined either by a symbol-by-symbol or by a bit-by-bit basis and are stored in the soft buffers of respective HARQ processes.

3GPP TR 25.401, "UTRAN Overall Description" discussed at application page 3, line 29 *et seq.*, discloses the high level R99/4/5 architecture of Universal Mobile Telecommunication System (UMTS), as shown in application Fig. 1.

3GPP TR 25.896, "Feasibility Study for Enhanced Uplink for UTRA FDD (Release 6)" discussed at application page 4, line 20 *et seq.*, discusses uplink enhancements for Dedicated Transport Channels (DTCH).

3GPP TSG RAN WG1, meeting #31, Tdoc R01-030284, "Scheduled and Autonomous Mode Operation for the Enhanced Uplink" discussed at application page 5, line 16 *et seq.*, describes a new MAC sub-layer called MAC-e.

3GPP TSG RAN WG 1, meeting #31, "HARQ Structure", Tdoc R1-030247, is discussed at application page 6, second full paragraph. Every MAC-e entity corresponds to a user (UE), and application Fig. 6 depicts the base station (Node B) MAC-e architecture. Fig. 7 shows the S-RNC MAC-e architecture which comprises the reordering buffer of the corresponding user (UE). The number of reordering buffers is equal to the number of data flows in the corresponding MAC-e entity on the UE side. Data and control information is sent from all Node Bs within the active set to S-RNC during soft handover.

3GPP TR 25.896, "Feasibility study for Enhanced Uplink for UTRA FDD (Release 6)" is discussed at application page 8, first full paragraph. Due to Node B being unaware of the number of UEs transmitting at the same time, no precise control of the uplink noise rise in the cell may be possible.

3GPP TR 25.848: "Physical Layer Aspects of High Speed Downlink Packet Access", version 5.0.0, discusses a retransmission protocol with asynchronous HARQ feedback information that uses sequence numbers (SN) or other explicit identification of the feedback messages whereas protocols with synchronous HARQ feedback information identifies the feedback messages based on the time when they are received, as for example in HSDPA. The document states that feedback may sent on the

HS-DPCCH after a certain time instant upon having received the HS-DSCH .

WO 03/096567 discloses a retransmission method including receiving and temporarily storing a plurality of data blocks in a queue, wherein each data block includes a unique transmission sequence number (TSN). When the receiver determines that a data block having an expected TSN was not received, it generates a TSN status report message (for example, over an UL dedicated physical control channel) indicating that the expected TSN was not received. Then, the transmitter retransmits the data block including the expected TSN in response to the TSN status report message. The retransmitted data block is placed in a specific location in the queue designated by the TSN status report message.

US 2005/0226182 (which corresponds to WO 03/021903) discloses calculating a maximum transmission power of a downlink data channel that is allowed to be newly allocated to a single user and estimating a necessary minimum increased power amount as a minimum increase amount of transmission power of the downlink data channel which is necessary for a terminal to receive user data with no error. Next, the system examines whether or not the necessary minimum increased power amount is equal to or smaller than the maximum transmission power that is allowed to be

additionally allocated. If the necessary minimum increased power amount is equal to or smaller than the maximum transmission power that is allowed to be additionally allocated, then the system sets an increased power amount as an increased power amount of the transmission power of the downlink data channel. The transmission power of the downlink data channel is increased by the increased power amount.

WO 03/096617 discloses a wireless communication system which reduces the latency of an RLC layer retransmission by prioritizing a retransmission of a PDU over a subsequent PDU in the buffer of a Node B for example. The system operates such that a RNC transmits a plurality of data blocks to a UE via a Node B. The UE sends a status report to the RNC, indicating whether each of the transmitted data blocks was received successfully by the UE or needs to be retransmitted. The RNC marks each data block that needs to be retransmitted and sends the marked data blocks to the Node B. The Node B receives, temporarily stores and prioritizes transmission of the marked data blocks over other data blocks previously received and stored in Node B. The Node B transmits the marked data blocks to the UE before the other data blocks. Thus, retransmissions are assigned to a higher priority queue so that they supercede transmission of other data blocks

which originate from the same "original" transmission buffer. The scheduler services the higher priority queues first.

EP 1286491 discloses a multichannel ARQ system providing for flexible timing of ACK/NACK messages without signaling overhead. Data packets are transmitted from the transmitter to the receiver in first predetermined time intervals. ACK/NACK messages are transmitted from the receiver to the transmitter on the feedback channel in second predetermined time intervals. The system allows for an ACK/NAK signal to be transmitted at multiple time instances. These different feedback time intervals allow for operating different kinds of receivers having low as well as high processing times. A slowly processing receiver will use a different time interval compared with a faster receiver. Moreover, the used feedback time interval can be made dependent on the reception quality.

USPN 6,018,516 discloses a data retransmission technique which minimizes retransmissions including clamping a retransmission of data to a clamp time which is measured from a prerecorded time of original transmission of the data, determining an elapsed time since the transmission, and permitting the retransmission whenever the elapsed time exceeds the clamp time without receipt of an acknowledgment. If an acknowledgment occurs while the retransmitted data is still being

held, then the retransmitted data is discarded rather than propagated through the network.

USPN 6,977,888 discloses a hybrid ARQ scheme involving incremental data packet combining that employs three feedback signaling commands: ACK, NACK, and LOST. The scheme is particularly adapted for communication systems using forward error correction (FEC) codes, with some of the code symbols being more important than other code symbols. The reference discusses hybrid ARQ involving saving an erroneously received and negatively acknowledged data packet and then combining it in some way with the retransmission, i.e., hybrid ARQ with combining. In such scheme, the "retransmission" may be an identical copy of the original packet or the retransmission may use incremental redundancy (IR), wherein additional parity bits are transmitted to make the error correction code more powerful than identical packet combining.

USPN 6,697,988 discloses a hybrid ARQ scheme in an asynchronous mobile communication system. Plural transport channels transmit a data block having a sequence of data bits and a control message having control bits required in decoding the sequence of data bits. A first rate matching part provided in a selected one of the transport channels, passing the data block, punctures a predetermined number of data bits from the data bits

within the data block. A second rate matching part provided in another transport channel, repeats the control bits for as many as the predetermined number of punctured bits. The second transport channel may include the control message arranged at either the head or tail thereof. The control message may include a serial number of a transmission data block, a version number of a given data block and a redundancy type in a given version. The second transport channel has a transmission delay time equal to or less than that of the first transport channel. The punctured data block and repeated control message are multiplexed and transmitted to a receiver.

USPN 7,054,633 discloses a power offset transmitting method for controlling transmission power in a mobile communication system. Figs. 6A and 6B illustrate examples of setting different transmission power for an ACK and a NACK transmitted over an HS-DPCCH. In an actual UTRAN, a required QoS is set to a different value according to whether ACK/NACK information is ACK or NACK. In general, the Node B may mistake the ACK for NACK or the NACK for ACK. In the latter case, the system is considerably affected because the UE cannot receive reception-failed high-speed packet data any longer. Thus, the UTRAN requires higher QoS for the NACK as compared with the ACK. Transmission

power values are separately applied to ACK and NACK as illustrated in Figs. 6A and 6B.

B. Discussion of How the Claimed Invention Patentably Distinguishes over the References of Record

It is submitted that the references cited above, considered either alone or in combination, fail to disclose or suggest the subject matter of independent claims 28 and directed to:

(1) a HARQ retransmission protocol, wherein a mobile station transmits a data packet to a base station and receives a feedback message from the base station indicating whether the base station has successfully decoded the packet, and

(2) in case the mobile station receives a NACK feedback message, the mobile station transmits within the same transmission time interval (i) a retransmission data packet after a predetermined time span upon having received the feedback message and (ii) optionally other data, having a higher logical channel priority than the data of the retransmission data packet, using a maximum allowed transmission power permitted to be used by the mobile terminal, even though a transmission power required for transmitting the retransmission data packet and the other data is larger than the maximum allowed transmission power.

Various references of record disclose monitoring of transmission power, assigning priorities to transmissions, assigning different time intervals for transmissions, permitting retransmission only within a predetermined elapsed time, combining retransmissions with previous transmissions, or separate power levels for ACK and NAK. For example, US 2005/0226182 discloses a scheme using maximum transmission power of a downlink data channel and a necessary minimum increased power amount as a minimum increase amount of transmission power of the downlink data channel which is necessary for a terminal to receive user data with no error. WO 03/096617 discloses a technique in which retransmissions are assigned to a higher priority queue so that they supercede transmission of other data blocks which originate from the same "original" transmission buffer. The scheduler services the higher priority queues first. EP 1286491 discloses a multichannel ARQ system in which ACK/NACK messages are transmitted from the receiver to the transmitter on the feedback channel in second predetermined time intervals. The system allows for an ACK/NAK signal to be transmitted at multiple time instances. USPN 6,018,516 discloses a data retransmission technique which permits a retransmission whenever an elapsed time exceeds a clamp time without receipt of an acknowledgment. USPN 6,977,888 discloses a technique of saving an erroneously received

and negatively acknowledged data packet and then combining it in some way with a retransmission. USPN 7,054,633 discloses a technique in which transmission power values are separately applied to ACK and NACK. However, the references of record, considered alone or together, fail to teach or suggest at least the subject matter of, in case a mobile station receives a NACK, the mobile station transmits within the same transmission time interval (1) a retransmission data packet after a predetermined time span upon having received the feedback message and (2) optionally other data, having a higher logical channel priority than the data of the retransmission data packet, using a maximum allowed transmission power permitted to be used by the mobile terminal, even though a transmission power required for transmitting the retransmission data packet and the other data is larger than the maximum allowed transmission power.

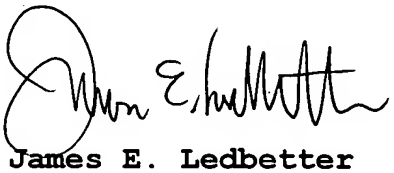
Thus, the Applicants submit that the above-noted combinations of features of the independent claims are not taught or suggested by the combined teachings of the art of record, and thus the independent claims, and all claims dependent therefrom, are patentable.

Accordingly, in light of the foregoing discussion pointing out how the claimed invention distinguishes over the cited references, the Applicants respectfully submit that the

inventions of all the presently pending claims are not anticipated by these references and would not have been obvious over any combination thereof.

Grant of special status in accordance with this petition is respectfully requested.

Respectfully submitted,



Date: July 26, 2006

James E. Ledbetter
Registration No. 28,732

JEL/att
ATTORNEY DOCKET NO. L7725.06112
STEVENS, DAVIS, MILLER & MOSHER, L.L.P.
1615 L STREET, NW, Suite 850
WASHINGTON, DC 20043-4387
Telephone: (202) 785-0100
Facsimile: (202) 408-5200